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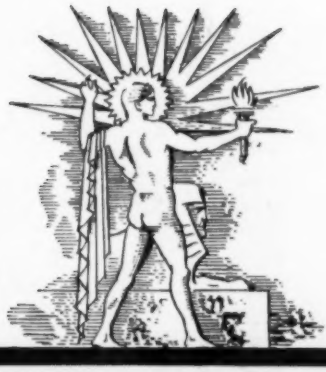
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



November 18, 1939

Nobel Prize Winner, 1939

See Page 323

A SCIENCE SERVICE PUBLICATION

Do You Know?

By painting the shells fired in big guns during target practise, it is possible to tell from the rim of paint left on the target hole which guns scored the hits.

An ice box rule to remember: Most fruits and vegetables of the temperate zone stand storage temperatures nearer freezing point than produce of tropical origin can take.

Ancient artists did not use perspective as we know it, one reason being that the principle of parallel receding lines converging to a common vanishing point was not understood until the Renaissance era.

Greek myths about the adventurous quest of the Golden Fleece may have had some basis in actual Greek commerce: rough wool skins or woolen cloths were used in the Near East to pick up gold particles in streams.

Corduroy, not exactly the same cloth used for clothing, but a special weave with cut threads, is used to catch gold at placers and in milling plants when the precious metal won't amalgamate with mercury, the U. S. Bureau of Mines reports.

"Every explosion of a mine, torpedo or depth-bomb, whether or not it sinks a ship, is capable of destroying enough herring or other fish to feed the inhabitants of a village for months," says Dr. Robert C. Murphy, president of the National Association of Audubon Societies.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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PHYSICS

Who received the Nobel Prize in physics? p. 323.

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PSYCHOLOGY

What effect does propaganda have on the unwilling mind? p. 334.

The United States ordinarily gets half its furs from other countries.

The wax film used commercially to protect high-grade vegetables is very thin and washes off quickly in warm water.

Twenty minutes is as long as children can stand without fatigue, it was found during the measuring of American children for standardizing clothing sizes.

Plague disappeared in England about 1680, after five epidemics in 140 years.

Making plastics from coffee beans is a new South American development which may provide an outlet for surplus coffee.

London's famous Royal Botanic Gardens in Kew have been closed to the public, because it was impossible to construct adequate air raid shelters there.

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PHYSICS

Nobel Physics Prize Honors Machine as Well as Its Maker

Professor Ernest O. Lawrence Receives Award For Invention of Cyclotron, Remarkable Research Tool

See Front Cover

THE 1939 Nobel Prize in Physics, won by youthful Prof. Ernest O. Lawrence of the University of California, is recognition to a most worthy recipient but it is also a tribute to a machine—the cyclotron—one of the most remarkable devices the human mind has yet produced and which has applications in investigations in many fields of science.

As a tool for smashing atoms the cyclotron—whirling charged atomic particles round and round at speeds approaching that of light—is unique. It delivers to these atomic "bullets" energies that enable them to pierce and change the very nuclei of other atoms and thus produce the transmutations of the elements that ancient alchemists talked about for centuries but never achieved.

Because it can easily create artificial radioactivity in nearly every element and make it give off rays like those coming from the naturally radioactive compounds, the cyclotron has a vital role to play in the treatment of cancer and other afflictions which yield to radiation therapy.

Moreover, cyclotrons (for the device of Prof. Lawrence has been and is being copied the world over in many laboratories) can, by making atoms radioactive, provide scientists in many fields with "tracer" atoms. These "tagged" atoms enable chemists, biologists, plant and human physiologists to follow through the transfer and utilization of chemical elements in plant, animal and human bodies. Each day they are finding explanations of how common-enough but little-understood processes occur.

While the cyclotron is not the only device for producing artificial radioactivity it is by far the best for a "mass production" of tracer elements so useful in other fields of science.

Honoring a machine, as well as a man, is no new thing for the Nobel Prize Award Committee.

The 1927 co-award of the Nobel Prize to Prof. C. T. R. Wilson of England was made for his invention of the Wilson cloud chamber, a device which makes it possible to see the tracks of atoms and atomic particles even though these minute entities are themselves invisible and probably always will be. The Wilson cloud chamber is a key piece of equipment in every first-rank physical laboratory the world over.

Young Prof. Carl D. Anderson of California Institute of Technology who won the Nobel Prize in 1936 for his discovery of the positron would be the first to thank the Wilson cloud chamber for making possible the identification of the positron.

The cyclotron's inventor, Prof. Lawrence, was only 38 years old last Aug. 8. Tall, blond and with rimless spectacles he could easily be mistaken—and has been—for one of his own students in the great Radiation Laboratory at California Institute which centers around his two cyclotrons; one weighing 85 tons and the new one, just finished, which weighs 200 tons.

Even as the newest cyclotron passed successfully its initial operation Prof. Lawrence was already at work seeking funds — something like $750,000—to build a still larger cyclotron that would weigh 2,000 tons and dwarf his present machines.

This cyclotron to end all cyclotrons is now only in men's minds, but as the usefulness of this type of apparatus is demonstrated anew each day the time draws nearer when it will become a reality.

Science News Letter, November 18, 1939

BEGINNING

Here Prof. Lawrence is holding the small model of the cyclotron. In 1931, this was its small beginning held in the palm of the inventor's hand. Now the latest cyclotron weighs 200 tons. And for the future one is promised weighing 2,000 tons.

CHEMISTRY

Young Men Gain Virility Through Nobel Prize Work

MANY young men cheated of their manhood by a mistake of Nature have been given virility as a result of the sex hormone research for which Prof. Adolph Butenandt, of Berlin, and Prof. Leopold Ruzicka, of Zurich, have just been given the 1939 Nobel Prize in chemistry.

The young men, probably several hundred of them by now, have been helped to develop into normal manhood by injections of the male sex hormone, or, more recently, by the aid of "hormone banks," tiny pills of the hormone which are injected under the skin and furnish several months' supply of the precious material at one time.

The hormone used in these treatments is testosterone. Normally this is formed in the male sex glands. Prof. Butenandt first obtained the male sex hormone in crystalline form from kidney excretions. This is called androsterone and is less active and slightly different in chemical structure from the testosterone formed by the glands. Both testosterone and androsterone have been synthesized in the laboratory from cholesterol. This part of the work, which has made the hormones available for medical use, was done by Prof. Ruzicka.

Before his research on the male sex hormone, Prof. Butenandt had worked on female sex hormone problems and discovered the chemical structure of one of these, progestin, the important chemical that prepares the mother's body for child-bearing.

Science News Letter, November 18, 1939

ENGINEERING

Giant Centrifuge Tests Mines And Bridges In New Research

America's First School of Mines, Columbia's School Of Engineering, Celebrates Anniversary with Exhibit

A WHIRLING merry-go-round of science is the latest testing machine for determining how bridges can be built and mines can be drilled safely.

At Columbia University's School of Engineering, celebrating its 75th anniversary, this centrifuge method of engineering testing was demonstrated publicly for the first time.

Prof. Philip B. Bucky of the Columbia School of Mines and his engineering students have built an enormous centrifuge in which can be placed models of the underground workings of a mine or models of bridges built to scale using transparent Bakelite plastic.

These structures are whirled faster and faster in the centrifuge merry-go-round and as they whirl the centrifugal force stresses them and thus tests them.

A force of 2000 times gravity is created.

In the case of the mine structure, the problem is to find just how far miners can go in cutting holes in the rock they are mining. Holes might cause the rock to smash to bits under the thousands of tons of other rock pushing down from above. The stress built up in the centrifuge substitutes for the real stress that might be encountered under actual working conditions. The miniature block of rock collapses when the speed is high enough, just as the real mine would under the force of gravity.

Prof. Bucky can thus tell the mining engineers in a real mine how far they dare have the miners go with safety.

Light is used to measure the stress in the whirling bridge models. Polarized light, light that vibrates in one direction only, from a powerful mercury arc lamp, is flashed on and off so rapidly in exact synchronism with the centrifuge that the transparent model bridge is seen as though it were standing still. Bands of light and dark move through the model and these photo-elastic fringes enable the Columbia engineers to calculate just how and where a real bridge of that same design will be stressed in actual service.

Science News Letter, November 18, 1939

A NEW laboratory device to test the lubricating properties of oil films only one-tenth of one-millionth of an inch thick has been invented by William Claypoole, first holder of a fellowship in the Columbia School of Engineering established by the Texas Oil Company of New York for lubrication research.

The device measures the friction encountered when diamonds and sapphires are rubbed over polished and thinly lubricated surfaces of steel, gold, platinum and rhodium.

The jewel point is pressed on the test surface with a force which can be as great as 100,000 pounds to the square inch. The lubricant under study is spread over the test metal and the latter is slowly rotated. The rounded jewel point is attached to a lever system which detects slight displacements due to friction.

In operation the investigator watches a recording meter and adjusts the pull necessary to balance the friction so that the pointer on the face of the dial stays at zero position. The adjustments are thus a measure of the friction which, in turn, depends on the lubricating qualities of the oil under investigation.

Platinum into Gold

THE ancient alchemists used to talk of transmuting base metals into gold but in results accomplished little. Scientists of Columbia University, as a demonstration stunt, achieved a transmutation of the elements which results in gold. The starting point was not base metals but precious platinum.

The modern alchemists were Dean George B. Pegram of the Columbia Graduate Faculties and Prof. John R. Dunning of the Department of Physics.

The method was to place platinum for some hours near a long glass tube containing a small amount of radium which emitted atomic particles that, by bombardment, turned platinum of atomic weight 195.25 into gold of atomic weight 197.2. The radioactive gold in turn emitted particles which alone made possible the detection of the transmutation.

Other demonstrations included:

The detection of radioactive sodium in the human body and its circulation by the blood.

The crushing of an eight-foot brick masonry pier in the compression testing machine of the school of engineering.

The demonstration of water seepage under power dams and through various types of soil structures.

A demonstration of the manufacture of isotopes by Prof. Harold C. Urey.

Science News Letter, November 18, 1939

SMALL BUT MIGHTY

This tiny photoflash bulb gives nearly a million lumens at peak.

PHOTOGRAPHY—ENGINEERING

New Midget Flash Bulb Has Million-Lumens Peak

IT USED to be that night and inside photography meant puffs of bothersome smoke, singed eyebrows, perhaps a burnt thumb or worse in the days of flashlight magnesium powder. Photoflash bulbs banished all that, but these have been bulky, the size of standard electric lamp bulbs, stretching pockets.

To the rescue on the 10th anniversary of the photoflash lamp debut comes a midget photoflash billed by General Electric's sales promotion as Mighty Midget, the World's Smallest Practical Photoflash Bulb. It is smaller than a golf ball, 24 to a suit pocket, a peewee lamp with actinic wallop, nearly a million lumens at peak flash. Peculiarities: Bayonet-type base like auto headlamps. It won't work with focal-plane shutters.

Science News Letter, November 18, 1939

MEDICINE

Sulfapyridine And Heparin Save Heart Disease Patients

Pneumonia Remedy and Blood Clotting Substance Combine to Rescue Patients Almost Certain to Die

PATIENTS doomed to an almost certain death from one kind of heart disease may be rescued by a new treatment which uses two of medicine's newest disease-fighting weapons. They are sulfapyridine, famous chemical remedy for pneumonia, and heparin, anti-blood clotting substance that has also recently reached the stage of practical application as a life-saver.

Seven patients with bacterial endocarditis due to the *Streptococcus viridans*, almost invariably fatal heart ailment, were given the new treatment by Drs. Saul R. Kelson and Paul D. White, of Boston. Three of the patients recovered; two of these have since remained well for from one to more than five months, they report. (*Journal, American Medical Association*, Nov. 4); the third case died of a different disease six months after the treatment and autopsy showed that the heart lesion due to the bacterial endocarditis was completely healed. The other four patients were unable to take the treatment long enough to be helped by it and three of them died.

The new treatment, Drs. Kelson and White state, "has in these first few months given more promise than any other method that we ourselves have used or heard of in the past."

They warn that the treatment is still in the experimental stage, that it should not be tried unless the doctor can watch the patient closely and is certain of the diagnosis, that it can do harm, but conclude "the possible benefit may well outweigh the risks, we believe, in this almost universally fatal disease."

This kind of heart disease is due to germ infection. The germs grow on the lining membrane of the heart in such a location that they are protected from the body's own germ-fighters in the blood. There is no way of increasing the number of these germ-fighters nor of getting them into closer contact with the germs, nor of dissolving the growth clumps of germs and fibrin from the blood.

The double-barreled action of the new treatment, however, seems to solve the problem. The sulfapyridine checks the growth of the germs, if it does not kill them outright. The blood-clot dissolving heparin can, it is believed, prevent further development of such clumps by reducing the ease with which the blood clots. It may also prevent the dangerous condition of an artery becoming plugged by one of the germ-blood clumps that so often gets free from its location on the heart, and it can check the growth of more of these vegetations, as they are called.

The idea of using heparin to treat this condition also occurred to another group of physicians who report in the same issue of the *A.M.A. Journal*. These men, Drs. Meyer Friedman, of San Francisco, and W. W. Hamburger and L. N. Katz, of Chicago, gave heparin without sulfapyridine to one patient. Unfortunately the man died of brain hemorrhage before treatment had been continued long enough to know whether it could help.

Sulfapyridine and sulfanilamide have both previously been tried in this fatal heart disease, with a few cases of recovery.

Science News Letter, November 18, 1939

GENERAL SCIENCE

Americans Spend Little For Their Education

IT IS always surprising how people spend their money. Here is the order of income usage revealed in the highly informative report on consumer expenditures in the U.S.A. just issued by the National Resources Planning Board: Food, 29%; housing, 16%; household operation, 9%; clothing, 9%; automobile 6½%; medical care, 4%; recreation, 3%; personal care and tobacco, each about 2%; transportation, 1½%; education, less than 1%, ranks last except for a few miscellaneous items. Thus about 85% of the $59,300,000,000 income in 1935-6 was spent for current consumption, 10% was saved, 4% given away to relatives, friends, churches, philanthropies, only 1½% as income and other personal taxes.

One-third of the Nation's 39 million families and individual consumers have incomes less than $780. The middle third received between $780 and $1,450. The top third varied from $1,450 to over a million! The lower one-third spent $7,000,000,000 on current living expenses, 14% of the total consumption outlay, with only $6,000,000,000 covered by current income and $1,000,000,000 from previous savings, loans from relatives, credit at stores, etc. The 178,000 consumer units with incomes of $15,000 or over devoted less than 40% of their incomes to consumption purposes. This top one-half of 1% of the nation received nearly 10% of the $59,000,000,000 consumer income in 1935-36, almost as much as the whole lower third.

Expenditures for medical care, $2,200,000,000 or slightly less than 4% of the total, covered only a little over three-quarters of the total medical bill of the nation. The remainder is met by free services supplied by public and private agencies. Education expenditures, just over $500,000,000, covered only a sixth of the total educational outlay of the nation, the most being met by public and private schools.

The auto is the predominant mode of transport. Almost 6½% of the total consumer income was given to the family car; only 1½% to all other kinds of transportation combined, streetcar, subway, taxi, bus, railroad, steamship, airplane, motorcycle, rented automobile, horse-and-buggy. Total cost for autos is $3,800,000,000.

Science News Letter, November 18, 1939

OCEANOGRAPHY

Newly Discovered Mountain Is Climbed Only by Fish

DISCOVERED: New mountain, nearly two miles high, guaranteed by the U. S. Coast and Geodetic Survey. Only fishes can climb it because it is underwater in the Gulf of Alaska 200 miles south of Kodiak Island. Its top is 4,700 feet deep. Usefulness of this discovery by U. S. survey ship *Surveyor*: Underwater landmark useful in navigation, since fathometer, echo sounding apparatus, can spot submarine peaks while ship is cruising full speed ahead. It would be equally as valuable as a landmark ashore.

Science News Letter, November 18, 1939

Mesh turbans, much like those worn twisted around the head by women today, were popular in Egypt 1,500 years ago.

GEOGRAPHY

World Has No Ideal State But Big States Come Nearest

AN IDEAL political state—if the world had a single one today—would be lucky enough to have the following assets, laid down by a Harvard University political geographer, Prof. Derwent Whittlesey:

1. The ideal state would be chunky, rather than long.
2. It would have its densest population at the center.
3. It would have naturally marked barrier boundaries.
4. It would be self-contained.

Large nations come nearest to fulfilling these ideals, and little fellows may find their greatest safety in fusing before they vanish, is the warning seen in Prof. Whittlesey's new study of the world's political geography, "The Earth and the State," (Holt).

Pointing out that five out of six of the most powerful states in the world are rubbing elbows in Europe because of the unequaled mineral resources massed there, Prof. Whittlesey says that it is no wonder they feel crowded when trying to compete under high-speed, machine-age conditions. Europe's states were formed on a basis of nationalities, back in days of rural life, isolation, and snail's pace communication. Now, "quite possibly all the states of Europe west of Russia are too small to fit the conditions of the twentieth century."

As a prototype of the fusing policy, by which small nations may save themselves, Prof. Whittlesey cites Switzerland. German, French, and Italian groups merged to form the Swiss nationality, because of geographic and economic interests. Today, diminutive Switzerland itself is far short of the ideal size for an effective modern state, and mergers of small nations may have to be on a larger scale.

The United States itself may yet redraw the pattern of its states into the larger units of government that work more smoothly in modern conditions, Prof. Whittlesey foresees, but knowing how Americans ordinarily express themselves about state changes, he adds:

"Quite clearly it will take a revolution in the political affairs of the country to alter the present pattern of states."

In the past, the world's state lines have been almost fluid, and even a region such as the Italian peninsula bounded by sea and mountains has been politically unified for less than 75 years in the past sixteen centuries.

For the future, Prof. Whittlesey advocates shaping states to harmonize with the regional pattern of the earth, and for that, he adds, political geography provides the needed facts.

Science News Letter, November 18, 1939

CONSERVATION

Sandbags Help Get Rid of Dunes Destroying Farm Land

SANDBAGS, used in Europe for defense in war, can be used in this country to undo mischief that is an indirect result of the last war, the U. S. Soil Conservation Service points out. Sandbags are used in abating sand dunes, that were formed by wind erosion during recent drought years.

The last World War is to blame for the dunes in a sort of House-that-Jack-built sequence: Price of wheat rose steeply in 1914. Farmers in the West broke sod on vast new acreage. Because the sod was gone, drought-winds blew the fine soil away, and piled the remaining sand into dunes.

If a dune forms a sharp crest, the wind will keep on building it up. If the sharp crest-line can be broken, the wind will undo its own work and blow the dune away. One way of breaking a crest-line is to set a row of sandbags along it. As the dune subsides, the sandbags go down with it, keeping the wind at its now beneficial work.

Other methods for breaking dune crest-lines involve the use of a disking machine, and pulling a pole drag along the crest of the dune with two teams.

The job is only half finished when the dune has been flattened, the Soil Conservation Service emphasizes. It is necessary then to tie the soil down by permanent plantings, preferably of tough, long-rooted grasses.

Science News Letter, November 18, 1939

MEDICINE

New Pellagra Remedies Have Been Discovered

TWO new chemical remedies for pellagra, Dixie's hard-times plague, have been discovered by a three-man research team, Drs. Charles E. Bills and Francis G. McDonald of Evansville, Ind., and Dr. Tom D. Spies of the University of Cincinnati and Hillman Hospital, Birmingham.

Nicotinic acid, however, continues to be a weapon with which doctors will treat and cure people sick with the rash and sore tongue and disordered minds and nerves of pellagra. But even when the effectiveness of this remedy was discovered, the possibility of other effective remedies was considered.

The two that have just been discovered are pyrazine -2, 3-dicarboxylic acid and pyrazine monocarboxylic acid. They are different chemically from nicotinic acid, but they cured 23 pellagra patients, Drs. Bills, McDonald and Spies reported to the Southern Medical Association. Whether these two chemicals are as good as or better than nicotinic acid as a pellagra remedy is now under investigation. Meanwhile it is pointed out that the effectiveness of the chemicals already demonstrated shows that "the body is adaptable in the use of building stones."

Science News Letter, November 18, 1939

CHEMISTRY

Industry Finds Increasing Use For Plastic Adhesives

INDUSTRIAL adhesives are being made increasingly of synthetic plastics. Older kinds of adhesives such as casein (from milk) and animal glue are still employed for joining together large parts of wood furniture. But for small light parts of metal, phenol fiber, and ceramic materials, synthetic plastic cements are satisfactory. They avoid use of bolts, screws, etc. In making telephones and other communication apparatus, resin-cellulosic lacquer adhesives and vinyl and acrylate polymers give strong tough joints affected little by moisture, corrosion or mildew.

Science News Letter, November 18, 1939

MEDICINE

More Than 80 Cancer Patients Given "Frozen Sleep"

Patients With Hopeless, Inoperable Cancer Treated With Relief of Pain and Apparent Regression of Tumors

MORE than 80 patients with hopeless, inoperable cancer have so far been treated with the refrigerated "frozen sleep" method, it was announced by Dr. Temple Fay of Temple University, Philadelphia, at the dinner meeting of the New York City Cancer Committee. Gradually lower and lower temperatures have been tried and patients have been maintained at temperatures of 75 degrees Fahrenheit, or more than 23 degrees below normal body temperature.

The refrigeration method for alleviating the pain of hopeless cancer and bringing about a regression of the cancerous growth has now been tried on patients between the ages of 17 months and 66 years, Dr. Fay said. Periods of treatment have ranged from 24 hours to eight days.

"The commercial world of science has come to our assistance recently and devised refrigerating units with blankets containing coils of tubing capable of regulation, and thermostatically controlled, offering a wide variation in temperature between 20 degrees F. and 140 degrees F.," Dr. Fay explained.

"These units have supplemented for the most part the cracked ice methods of temperature reductions in use only a few weeks ago and so far have seemed to offer prompt and favorable means by which patients' temperatures can be rapidly reduced from normal to the desired level."

Very recently, Dr. Fay said, it has been found that less and less sedatives are required as the refrigeration controls pain and suffering to a most remarkable degree and in every instance relief from pain has been obtained.

Dr. Fay emphasized that it has now been shown that patients can be maintained at body temperature levels below the point where carcinoma cells (cancer) can multiply and grow and that relief from pain by chilling can be applied in other conditions than cancer.

"Gross evidence of regression of tumors and improvement in the patient's general condition continues to reassure us that the application of refrigeration measures will eventually bring some form of reasonable and beneficial therapy," he concluded.

Dr. Lawrence W. Smith, associate of Dr. Fay in the "frozen sleep" method, described microscopic studies on the inhibition of the growth of young, embryonic and fast growing cells as the temperature is reduced. From studies on chicken embryos and their cessation of growth at 95 degrees Fahrenheit the present chilling of the whole body of cancer patients originated.

Dr. Smith predicted months and years of careful work would be needed "to understand the mechanism of these degenerative changes in the tumor cells, and to evaluate the usefulness of the method from a therapeutic standpoint."

Science News Letter, November 18, 1939

ORSATOMAT

Translated, a crystal-clear automatic gas analyzer permitting the researcher to watch the process going on within. Made of Lucite, it won an honorable mention in the scientific section of the Fourth Annual Modern Plastics Competition.

CHEMISTRY

Plastics Competition Covers Coat Hangers to Lenses

EVERYTHING from a new kind of coat hanger to the table tops for the Library of Congress have won awards in 1939's Modern Plastics Competition.

The widespread use of laminated plastics in the new Annex of the Library of Congress received a major award. Table tops, corrider wall panels, book shelves, drawer fronts in the card index room, were only a few uses of plastic products in this new architectural creation.

Luggage, whose surface is a laminated wood veneer imbedded in transparent plastic and which looks as though the modern traveller was carrying around part of a beautiful inlaid table top, won another award.

Plastics that have made possible continuous spinning and processing of viscose rayon yarn were recognized.

Other prize winners include:

A plastic garment hanger that keeps clothes from slipping off the sides and contains clips for sleeveless dresses.

A shoe stitching machine, fabricated of plastic, which markedly reduces noise.

A streamlined pressure reducing valve whose transparent plastic outer parts disclose the condition of intricate interior mechanisms for easy inspection.

Dentures made of plastics.

A small field glass having a square view—rather than a circular one—which is especially designed for sporting events.

Invisible contact lenses for the eyes, which require no frames.

A transparent, plastic clarinet.

A speedometer gauge for motor cars which magnifies two times and makes it easy to read the small markings.

An all-plastic shoe heel that won't split, peel, mar or crack.

Molded plastic jewelry.

Tennis and squash racquets.

The competition is sponsored by the trade magazine, *Modern Plastics*.

Science News Letter, November 18, 1939

BOTANY

War Threatens Existence Of Botanical Journal

WAR threatens the existence of the well-known and widely used international botanical journal, *Chronica Botanica,* published in Leiden, the Netherlands. Prof. Robert F. Griggs of George Washington University, has received a letter from its editor and publisher, Dr. Frans Verdoorn, in which the war-imposed necessity for suspending publication is announced.

Countries now at war have been the sources not only of the financial support of *Chronica Botanica* but of the scientific articles which have filled its pages. Both financial and scientific contributions have fallen away almost to nothing. In the face of a probably long war, Dr. Verdoorn feels that all he can do is finish the current volume and then shut up shop.

Only one possible way out suggests itself. Since Dr. Verdoorn and his wife have no source of income other than their journal, he now has to have a job. He is willing to come to the United States and continue publishing in this country, if he can find a position. He feels that even if this country should later be drawn into the war, scientific publication will not be affected here as it has been in Europe.

If nothing materializes along this line in America, Dr. and Mrs. Verdoorn intend to go to Java, where he has been offered a post desirable in every respect save that the publication of an international science journal can hardly be carried on in so remote a part of the world.

Science News Letter, November 18, 1939

BOTANY

Spanish Plant Collection Becomes Orphan of War

A BOTANICAL orphan of two wars is now in the United States, and no one knows what its ultimate fate will be.

It is the great Sesse-Mocino collection of plant specimens, gathered in Mexico in the late eighteenth century by the two Spanish botanists whose names it bears, under command of the King of Spain.

After Senors Sesse and Mocino had taken their botanical booty back home, the thousands upon thousands of sheets of pressed specimens lay bundled up and neglected, on the shelves of the Botanical Garden of Madrid. In 1887 a description of the plants was published, but it was scientifically out of date even when it appeared. And for nearly another half-century the collection was neglected.

Came Spain's revolution, and a new and more energetic curator to the Madrid Botanical Garden. He decided to send the whole collection to the United States, to get its nomenclature brought up to date and the whole business straightened out. Then, of course, it was to be sent back home.

The Field Museum in Chicago was chosen as central headquarters. Parts of the great collection were shipped to various American botanists, specialists in the identification of particular plant groups. They were to report, and return the specimens.

Then came Franco's successful insurrection, overthrowing the Spanish republic, and on the heels of that comes the present war.

The Sesse-Mocino collection is still here, work on it is still proceeding in a score or more of American botanical workshops, and nobody knows for certain what is to become of it.

The problem, of course, may solve itself. A task of this kind takes years to accomplish, so that by the time the last American botanist has determined "a local habitation and a name" for the last puzzling specimen, the last shots in Europe may have been fired, and the Continent may again be a safe place for harmless, peaceful, valuable pressed plants.

Science News Letter, November 18, 1939

ENTOMOLOGY

Bacteria Cause Change In Color of Insects' Eyes

BACTERIA have been shown to be able to change the eye color in Drosophila, or fruit flies, in experiments reported by Dr. Edward L. Tatum of Stanford University, who has been working on a project financed by the Rockefeller Foundation. Such changes have hitherto been considered to be a monopoly of genes, or hereditary units within the cells of the insects themselves.

The change, from white to brown color in the eyes, is brought about by a hormone produced by the bacteria, working in conjunction with tryptophane, an amino acid which is part of the flies' diet. The bacteria-produced hormone seems to be identical with a hormone produced by the flies, under certain conditions.

Dr. Tatum made his discovery when the tryptophane used in feeding his fruit flies became contaminated with a still-unnamed species of bacterium.

Science News Letter, November 18, 1939

IN SCIEN

ARCHAEOLOGY

Pine Trees Promise Means Of Dating New England Past

PROSPECT that New England pine trees may "talk," revealing dates in New England's aboriginal prehistory, is seen as a result of a test of the tree ring method of dating old and buried timber, reported by Prof. Charles J. Lyon of Dartmouth College. (*Science,* Nov. 3.)

Dr. Lyon has determined that buried timber at the abutment of an old bridge near Wolfeboro, N. H., was cut about the year 1806. He dated the white pine logs by studying annual growth rings in cross-sections of the wood, and by matching the outer rings with inner rings of other white pines that were felled not far distant by the hurricane in September, 1938.

A calendar of Arizona pine trees formed by this method has enabled archaeologists to set dates on prehistoric Indian pueblos and cliff dwellings in the Southwest, and archaeologists have hopes of constructing similar tree ring calendars for other sections of the country, using certain trees which may keep a sufficiently distinctive record.

Science News Letter, November 18, 1939

ECONOMICS

Germany Said to Face Peril Of Defeat by Scarcity

IN a frankly anti-Hitler book, *From Nazi Sources: Why Hitler Can't Win* (Alliance), here is the verdict on food and raw materials in Germany: If Germany is left to her own resources, famine will overtake her sooner than in the last war. Today, as in 1914, Germany is facing the peril of being defeated by hunger despite her possible military successes on the battlefields. It is quite out of the question that the Reich could ever make herself independent of imports in wartime. At no time will it be possible for Germany to produce sufficient oil in her own territory to satisfy her wartime needs. Ersatz production increases production costs and reduces the size of the army available while it fails to diminish Germany's dependence on foreign imports.

Science News Letter, November 18, 1939

NCE FIELDS

CHEMISTRY

Milkweed May Find Use As Meat Tenderizer

MAKING tough meat tender is the job that promises employment for one of America's unemployed plants, milkweed. Botanists and biochemists at the University of California have discovered in its juice an active substance that can tenderize meat as successfully as can papain, extracted from the tropical plant, papaya, now used on a large scale for the purpose.

The quantity of the new-found substance in milkweed juice is small, but it is believed that large-scale and intensive cultivation of the plant might make its production profitable. At present, papaya imports amount to half a million pounds a year, costing several million dollars.

The active principle of the milkweed has been named asclepain, from the botanical name of the plant, *Asclepias*, by analogy with the formation of the word papain from the plant name *Papaya*.

Interstate shipment of meat that has been treated with papain and other medically active substances is not permitted by Federal authorities. Not that papain is harmful, it was explained to Science Service in Washington; but it is held best policy for the consumer, acting either under the advice of his physician or on his own initiative, to administer such treatment himself if he so chooses.

Science News Letter, November 18, 1939

ARCHAEOLOGY

Egyptian Tomb Preserves Remarks of Men at Work

YOU CAN hardly imagine a modern mausoleum decorated with scenes of traffic and butcher shops, with remarks by the people in the pictures written alongside, as captions. Remarks such as "Keep going!" and "Give a hand, there."

But this sort of art was familiar to ancient Egypt. A vivid example, exhibited in Philadelphia, is on a government official's tomb, which archaeologists brought all the way from Sakkara in Egypt to be set up in the University Museum of the University of Pennsylvania.

An archaeologist at the museum has got around to translating conversation recorded on this tomb. It gives you a good sample of the orders and chat of men at work, 2500 B.C.

Along the tomb's entrance passage, the walls are sculptured with low-relief scenes of ships and rowboats. In such transportation the soul of Kaipure, the tomb owner, expected to journey to the other world. Efficiency of the crews is assured by brisk commands inscribed in columns of hieroglyphs.

The captain calls: "Give attention to the rope! The wind is behind thee again!" and "To the west, to land in the middle!"

These are warnings to the man on the cabin roof who turns the spar of the sail to catch the wind.

The captain also urges the rowers: "Work hard! The wind—"

Kaipure was a government official in the treasury, a sort of chief clerk or assistant secretary. His tomb chamber is sculptured all over with processions of servants laden with food and other supplies that he wanted brought to his tomb.

Conversation in the butcher shop scenes has been interpreted. Says one butcher, wielding a large knife on a carcass: "Take hold!" And the assistant replies in what may be an ancient equivalent of OK, "I will do it so that you will approve it."

Other workers call out similar efficient orders and get willing response in this shadowy tomb world.

"Such inscriptions bring us nearer to the real life of the Egyptians," says the archaeologist. "It is a pity that only a comparatively few have been left to us."

Science News Letter, November 18, 1939

PHYSIOLOGY

Mobilizer For Body's Germ-Fighters Discovered

AN AS yet unidentified substance which acts as mobilizer of the white blood cells, sometimes called the body's germ-fighters, has been discovered in the exudate that accompanies inflammations. The substance apparently acts primarily on the bone marrow, causing white blood cells of a certain type to pour out into the blood stream, Dr. Valy Menkin, of Harvard Medical School, says in reporting his discovery. (*Science*, Sept. 8)

Science News Letter, November 18, 1939

ASTRONOMY

Twelve Comets Found Already This Year

THE DISCOVERY of a new and unexpected 12th magnitude comet on Nov. 1 by Clarence L. Friend, of Escondido, Calif., brings to 12 the number of comets which so far have been sighted by astronomers during 1939.

Seven of these comets have been of the periodic type which return to the region of the sun and earth at regular intervals which astronomers can calculate accurately. As might be expected, professional astronomers working in large observatories rediscovered all these returning comets.

Of the five new and unexpected comets found so far this year, two have been spotted by amateur astronomers alone, two jointly by an amateur and a professional and only one by a professional astronomer alone.

Significant mark of the new Friend comet is its rapid motion. From its originally discovered position in the "keystone" of Hercules near right ascension 16 hours, 52.9 minutes and declination plus 34 degrees, three minutes, it moved rapidly east and south.

Science News Letter, November 18, 1939

ENGINEERING

Byrd Expedition Takes Non-Frosting Window Panes

SIXTEEN panes of non-frosting glass windows will go aboard the *North Star* of Admiral Byrd's U. S. Antarctic Expedition when it stops at Philadelphia on its way to the South Seas and to the great frozen Antarctic continent.

The new windows consist of layers of heat tempered glass with the space between them filled with dehydrated air. With no moisture within to condense and freeze, the panes will supply good light for the new laboratories to be established by the expedition. Being heat tempered, the panes have added strength which will allow the scientists to walk on them, if necessary, and shovel off snow.

Each pane is three feet long and one foot, nine inches wide. They will form skylights in the roofs of the prefabricated laboratories now in the hold of the *North Star*.

Called Thermopane by its makers, the Libbey-Owens-Ford Glass Company, the commercial use of the new type non-frosting windows will be in display refrigerators in meat and other markets.

Science News Letter, November 18, 1939

MILITARY SCIENCE

Powerful Little Guns

Uncle Sam Has Armed Himself With Powerful, Mobile Weapons Against Planes, Tanks and Enemy Artillery

By DR. FRANK THONE

SPECTACULARLY devastating as are the big guns—the 16-inch coast defense pieces and the 14-inch railway guns—the center of the stage in the military show just now is being held by the little guns.

There is a reason. The big fellows are terrific, but ponderous and slow. They have to stay far in the rear, and their job is to reach equally far into the enemy's rear, pounding his roads, supply depots, traffic centers generally; trying (if possible) to locate and smash in the very private and special dugouts where the Staff brass hats congregate.

But the little guns go forward with the troops that do the real fighting—up on the front line with the doughboys and machine-gunners, out on the flanks with the mechanized cavalry. They have personal knowledge of where the danger-spots and tough tactical problems are, and they bite directly at them, quickly and sharply.

Of three species are the little guns of the American army, each with its special job. One is designed to stop the charge of the tanks, one to make the air too hot to hold airplanes that come at low altitudes to drop strings of light bombs and to strafe with machine-guns, the third to drop small but effective doses of TNT into subborn machine-gun nests and other strong points on the ground. They are all of newest design, and only now are ready for quantity production to equip all of America's fighting forces.

Anti-Tank Weapon

The new anti-tank gun is the grown-up offspring of the 37-millimeter cannon, of first World War fame. Its barrel is nearly twice as long as that of its predecessor, and it uses a lot more powder to push its projectile. These two factors combine to give it a terrific velocity, even though the shell is double the weight of the World War missile—two pounds instead of one. (*See p. 332*)

This high velocity, combined with the greater weight, does two things: it makes the trajectory or line of flight so flat that any tank closer than 1000 yards is constantly in the "danger zone," and it gives the light projectile such a punch that it is certain to penetrate any ordinary tank's armor, to burst inside with wrecking, deadly effect.

Had the Polish army been able to muster a few hundred anti-tank guns like these, history might have taken a different course in the fatal month of September.

The anti-tank guns can not only shoot fast and hard, they can travel fast and hard as well. They are mounted on balloon tires, which permit them to be towed behind high-speed trucks at 50 miles an hour on any kind of half-way decent roads. The whole piece weighs less than half a ton, so that its crew of four or five men can grab it and hustle it across fields and through woods.

Mobile Anti-Aircraft Weapon

The second new little gun, the 37-millimeter automatic anti-aircraft weapon, also goes to work on a trailer, but it is a four-wheel trailer instead of just the two wheels of the gun itself. To give the gun greater steadiness in firing, the wheels are lifted clear of the ground when the gun is in position, and the base becomes a solid platform, very hard to shift or rock. The change from "march order" to firing position can be made in a few seconds by the well-drilled, quick-moving crew.

Fires 120 a Minute

Once it goes into action, the reason for this insistence on a solid firing platform becomes evident. The gun barks away like an over-size machine-gun, spitting its high-explosive projectiles into the air at the rate of 120 a minute. It can swing clear around in a complete circle, and it can change elevation from flat horizontal to fully vertical, banging away all the while.

Its shells have fuses so sensitive that they will explode the instant they hit the wing of an airplane, or punch through the thin metal skin of its fuselage. Even if a hit does not disable the pilot or wreck the engine, the damage to wing or tail structure is almost certain to bring the plane down out of control. If one of the shells should happen to hit a loaded bomb rack—the conse-

ONE-MAN WEAPON

Newest and handiest of the mortar family is this little 60-millimeter weapon. It can lob its 3.3-pound projectile a little over a mile, with really astonishing accuracy. Weighing less than 50 pounds, it can be carried by one man if necessary.

AIMED ABOVE

Low-flying planes, intent on bombing troops or supply trains, will get a waspish reception from the new 37-millimeter anti-aircraft gun. Its automatic fire spins 120 shells a minute into the air, each one so sensitively fused that it will burst on contact with wing or fuselage skin.

quences had better be left to the imagination.

Advance of all-metal airplane construction has made the destructive task of these small shells easier, rather than more difficult. When Army Ordnance men first began experimenting with shells of this type, fabric construction necessitated a fuse so sensitive that it would cause a burst if it hit a large raindrop. This made lots of trouble. But the use of more rugged material in planes permits the use of a more rugged fuse in the shells intended to destroy them.

Adoption of the new 37-millimeter automatic fills a troublesome gap in defense against aircraft. The Army has for some time had a satisfactory gun for use against high-flying heavy bombers. Machine-guns, even rifle fire perhaps, could do something against very low-flying "hedge-hoppers." But the attack plane, dropping light bombs from low-to-medium altitudes, still lacked an antidote. The new piece promises to take care of this job.

Mortar Used for Short Range

The two 37-millimeter pieces are, as we have seen, high-velocity jobs. Bark and bite are so nearly simultaneous that it simply isn't funny—to the enemy. The third little gun, however, is quite a different breed of cannon.

It is a mortar, a high-angle, smooth-bore weapon that points its muzzle skyward and lobs a slow-flying missile at the enemy at comparatively short range. Its caliber is 60 millimeters (not quite 2½ inches), and the extreme range to which it can heave its 3½-pound projectile is only a little over a mile—1900 yards, to be exact.

The job of a mortar is to go along with the first waves of attackers, and blast out stubborn concentrations of fire power too well entrenched to be reached with rifles and too far away to be within the very short range of hand grenades. This 60-millimeter piece can be used at distances as short as 75 yards, which is just beyond the throwing range of a stout grenadier.

Very Mobile

It is exceedingly light, and hence highly mobile. With all its accessories it weighs less than 50 pounds. One man can lug it alone, if need be; two men can pick it up and carry it along at a dead run. And it is so small and inconspicuous that it can hide in a ditch a couple of feet deep, or behind bushes a few feet high. It makes no smoke at all when it is fired, so that it is exceedingly hard to locate, even at a very short distance.

Unlike its ancestor of 1914-18, the three-inch Stokes mortar, this new weapon is really quite accurate. The Stokes mortar fired ordinary artillery shells by means of a small charge attached to the base. The projectiles tumbled end over end as they sailed through the air, like pieces of stovewood.

After the war, a French military engineer named Edgar Brandt improved the mortar projectile by streamlining it and giving it a set of tail-fins to steady its flight. The U. S. Army adopted his design for their standard infantry mortar, an 81-millimeter weapon, of which the new 60-millimeter mortar is a lightweight brother.

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BOTANY

Plants More Immortal Than "Everlasting Hills"

THE "everlasting hills" are mutable, evanescent; the grass which perisheth has in it the pattern of immortality. This paradox of living as against non-living is pointed out by Donald Culross Peattie in his new book, *Flowering Earth*.

Himalayas and Rockies are creatures of geologic yesterday, Mr. Peattie points out; the Appalachians are of respectable middle age. "But if you want to see really old mountains you must travel to the Laurentians of Canada. Look carefully—you will observe that there are no mountains there any more; just a stump, a boss on the continental shield. The stuff of them has found its grave under the seas. The grave of something that was never alive.

"But that which lives is less mortal. Plants there are today made after the image and the very mold of plants half a billion, and a billion years ago."

Non-living rock, hard and rigid, can only stand still while living things—lichens, mosses, bacteria—pluck at it, while rain and wind reduces it to dust, the author points out.

"But you can batter a seaweed on the reefs for twice ten million years, without changing its inner convictions. All that the surf has been able to accomplish in these eons is to knock the spores out of the slippery fronds—and so set them adrift to colonize some other reef."

In his book Mr. Peattie looks at plant life through a hundred windows—the Harvard laboratory where he first boiled chlorophyll out of a handful of ivy leaves, the mouth of a cave where men cowered in the chill of the Pleistocene, his own house in California where a small bird has woven an exquisite nest out of lichens and lined it with sycamore seed-down. Through its pages, plants from lowly alga to sophisticated orchid insinuate themselves into the reader's consciousness as they have long rooted themselves in his life—whether he has known it or not.

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NEMESIS FOR TANKS

The new 37-millimeter gun that hurls its two-pound armor-piercing shells with the speed and force of small thunderbolts. They break through the walls of their target and burst inside. (See page 330.)

PHYSIOLOGY

Vitamin A Therapy Aid In Matching of Colors

VITAMINS have received advertising promotion almost unequalled by any other science achievement, but here is a story not from a drug house or a doctor, but a factory. Vitamin A therapy, giving of carotene in oil, sharpened the color discrimination of inspectors of porcelain so that more than $5,000 a year was saved on assembly of ranges at Mansfield, Ohio. Fewer changes were necessary because of off-color parts after assembly, less customer complaint. Vitamin A regenerates the visual purple in the eye's retina vital to seeing.

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LANGUAGES Made *easy* By LINGUAPHONE

This amazing new Method enables you, *in your own home*, to speak and read any of 27 foreign languages in an incredibly short time. Endorsed by leading university professors and thousands of men and women as the quickest, simplest and most thorough language method. Send for FREE book.

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PHYSICS

To Heat and Air Condition House With Solar Energy

Experimental House Built By MIT Will Try Several Types of Heat Traps and Store Energy in Basement

TRAPPING the heat of the sun as it falls on the roof of a house and storing it in the basement for future use is to be attempted at the Massachusetts Institute of Technology soon, as part of a long-range program on the possibilities of using solar radiation as a direct source of energy.

An experimental house, which the scientists plan to heat during the winter, air condition during the summer and possibly even supply with power, all with the energy of sunlight, has already been constructed and the research is expected to begin at once.

One of the major features of the house is a large, well-insulated water storage tank which is to be used in ironing out the fluctuations in heat which are inevitable with a source as variable as the sun.

The heating system is based on a method of forcing air either over the hot surface of the tank or through the coils of a refrigeration system which is also to be run on energy stolen from the sun.

Prof. Hoyt C. Hottel, who is in charge of the program, plans to try several types of "heat traps," or energy collectors, during the research. First attention will be devoted to a shallow, box-like device which will be placed in a recess in the building's roof.

For a bottom this box has a thin sheet of metal, painted black to absorb as much of the sun's heat as possible. Firmly fixed to this bottom is a series of small, thin-walled metal tubes which are to be heated by contact with the sheet and which will then pass this heat on to water circulating through them.

This box has a series of glass covers, separated by dead air, through which nearly all the sunlight can pass but through which little heat can escape back to the outside. The sunlight is converted to heat as it strikes the metal sheet and the whole arrangement has a layer of mineral wool beneath it to prevent heat escape in that direction.

The warm water in the coils is then piped, through carefully insulated tubes, to the well-insulated storage tank where the engineers expect to keep it hot anywhere from a few weeks to six months, depending on the size of the tank.

Just what size units will be used has not been determined. A large sunlight trap, one big enough to heat the house directly, and thus needing but a small tank, may be used or they may try a small collector which would trap heat all summer with a huge tank capable of hoarding an entire winter's supply of heat.

The best size for these units, the most heat-absorbent paint, the most effective number of glass plates and the best angle at which to slope the roof are among the problems to be investigated. The experimental house, Prof. Hottel pointed out, is more a laboratory than a model dwelling, small but with a large wall surface in proportion to volume. This has been compensated for by extensive insulation.

Prof. Hottel also emphasized that he and his colleagues are well aware that the amount of solar heat in New England would make domestic heating by solar radiation uneconomical in comparison with other heat sources but there is sufficient sunshine in this region to test the efficiency of heating systems for those localities where the climate is less rigorous.

BOOKS

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●RADIO

Dr. J. C. Steinberg and H. C. Montgomery of the Bell Telephone Laboratories will entertain with synthetic deafness as guest scientists on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Monday, November 27, 4:30 p.m., EST, 3:30 CST, 2:30 MST, 1:30 PST. Listen in on your local station. Listen in each Monday.

The research is one of several projects planned at M.I.T. under the terms of a gift of nearly $650,000 from Dr. Godfrey L. Cabot of Boston "for research on the utilization of solar radiation for the tasks of man." In addition to the house-heating project the program calls for various fundamental investigations of direct physical and chemical methods of tapping this almost limitless source of energy, a source that on an average day yields as much as a horse-power per square yard of earth.

Science News Letter, November 18, 1939

CONSERVATION

Snowplows Build Ridges To Keep Moisture

SNOWPLOWS have something to do in the wheat-growing Northwest besides clearing roads. Snow is more than a bothersome traffic obstruction there, it is the farmer's principal frozen asset, especially after a droughty autumn like the one just past. Recommended off-highway job for snowplows therefore is to conserve snow on the fields.

The technique developed by Prof. H. F. McColly, of the agricultural engineering department of North Dakota Agricultural College, is to run the snowplow through the fields when the snow is about five inches deep on the level, building up ridges 18 inches high and about eight feet apart. This should be done when the snow is wet enough to pack; if straw and stubble are mixed in, so much the better. The ridges follow contour lines on sloping fields, and in flat country they are made to lie at right angles to the direction of prevailing winds.

Between the ridges midwinter snow is not blown away, but is trapped and held, as in the lee of a snow fence. Soil, too, even if not yet covered, is guarded from the scouring blasts. When a thaw comes the ridges, now compacted and perhaps frozen fast to the earth, serve as levees to hold the water and let it seep into the soil, not to rush away as runoff and perhaps carry eroded soil with it.

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Our Debt to Old Bohemia

"MY grandfather would have got a big kick out of this!" Frank Cermak ran a caressing finger along a transformer insulator, ready for the kiln. "He was a skilled pottery maker in Bohemia—turned out beautiful urns and vases. But he never tackled a job like this. It's about the biggest we've done."

Frank Cermak, head of the G-E Porcelain Department, isn't afraid of big jobs. His family have been skilled porcelain craftsmen for generations. His father, back in 1891, organized the department that Frank now manages. And Frank's son, too, is following the family tradition.

Ancient skills, passed on from father to son for generations, still play a part in modern industry. Porcelain craftsmen, for instance, produce insulators which make possible the transmission of electricity from the powerhouse to homes and factories, where it serves you in a thousand different ways.

In General Electric are hundreds of men who, like Frank Cermak, are applying their special skills to the task of making electricity more useful and less expensive. These experts—scientists, engineers, skilled workmen—are helping to provide you with the comforts and conveniences that electricity makes possible. They, too, are devoting their lives to the creation of More Goods for More People at Less Cost.

G-E research and engineering have saved the public from ten to one hundred dollars for every dollar they have earned for General Electric

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PSYCHOLOGY

Propaganda Is Found Ineffective When Minds Are Not Ready

Atheists and Believers Hearing Same Arguments For and Against a Personal Deity Retained Opinions

One of a series of timely releases on war propaganda prepared by the Society for the Psychological Study of Social Issues, a group of psychologists interested in current social problems.

BRITISH, German, or domestic propagandists can accomplish in the United States only what the pre-existing attitudes of the American population will allow, it is demonstrated by recent psychological research.

If an individual has strongly favorable attitudes toward one or more of the belligerent countries, he is not likely to be affected immediately by the propaganda of the other side. But he is ready to believe and remember propaganda from the country with which he already sympathizes.

An experiment recently performed by Prof. George W. Hartmann of Teachers College, Columbia University, and Dr. Walter Watson of Cooper Union Institute of Technology shows the limitations placed upon propaganda by the person to which it is directed.

One group of ten believers in a personal deity and one group of ten atheists were asked to read and evaluate a series of arguments for and against the existence of a personal deity. Both groups were able to recognize the most telling points of their opponents and they remembered these points better than the arguments which they considered weak. The arguments which supported an individual's point of view, however, were better retained than those which were opposed to it.

An increased acquaintanceship with an opponent's philosophy, these investigators found, had no effect upon the subject's religious outlook.

The atheists remained atheistic and the theists retained their belief in the existence of God. The two groups were no nearer together after their new experience than they were at the start.

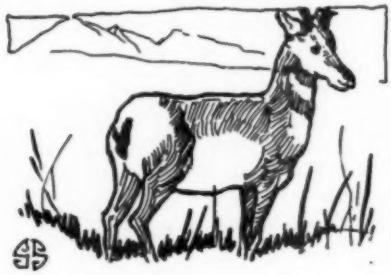
The Society for the Psychological Study of Social Issues calls attention to the fact that the beliefs which people now consider good or bad help determine what a propagandist can accomplish. This statement, the Society feels, must be emphasized at a time when the layman's growing sensitivity to the realities of propaganda during a war has led him to attribute a diabolic power to the man equipped with the techniques of mass psychology. Many persons now suspect that their most intimate opinions are being manufactured for them by others; and that they themselves would not necessarily approve of the cause to which they are being converted if the real purpose of the propagandist were revealed to them. Although the facts partly justify the fears and skepticism of the enlightened citizen, the Society also points out, there are limitations to all propaganda which lie within the individuals who are to be affected.

Science News Letter, November 18, 1939

About one-sixth of the Christmas trees used in the United States come from Montana.

GEOGRAPHY

NATURE RAMBLINGS
by Frank Thone



Geography of Songs

THE LANDSCAPE in a poet's eye can be pinned down on the map, if one has a little knowledge of natural history.

That "Home on the Range," for example, tunefully longed for through millions of radio sets almost every night, must have been somewhere in central Texas, or perhaps in Oklahoma.

It figures out this way: Deer are animals of the open woods, whereas antelope favor the open, grassy plains. Therefore the range country the original minstrel was thinking about must have been in some region where there is both timber and grassland.

The edge of the foothills country from Colorado northward would fit this description as well as the timber-edge region in Texas. But the poet goes on to yearn for "a land where the bright diamond sand flows leisurely down the stream;" and streams aren't leisurely in the foothills.

Furthermore, the "range" of the song seems to be fairly remote in time. The "graceful white swan" must be either the whistling swan, which is now comparatively rare, or the trumpeter swan, which is nearly extinct. Both were at least fairly abundant in the West up until about sixty years ago, when recklessly-shooting white men invaded the region in numbers.

Not all poets give so full a description of the country of their dreams, yet sometimes even a passing phrase localizes the picture. When John Howard Payne wrote into "Home, Sweet Home" that line about "the woodbine, whose fragrance," he put his mother's imaginary cottage somewhat to the south of New York City, which was his actual home town.

There are two vines commonly called

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woodbine in the United States. One is the Virginia creeper or five-fingered ivy, which is not fragrant. The other (really the one entitled to the name) is a naturalized vine honeysuckle from the Old World, which thrives well in the South, but is hardly to be found north of central New Jersey. Payne probably got to know the vine well during a period he spent with the Cherokee Indians in the Southern Appalachians.

Probably the most exploited plant in present-day lyrics is cotton. It constitutes the entire vegetation of the south, especially Alabama, in the rather weird geobotany of the bards of Tin Pan Alley—for whom Dixie begins at the southern environs of Jersey City.

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ENGINEERING

Germany May Well Attain Adequate Aviation Fuels

IMPLIED warning that America must not assume eventual failure of the German air force through Allied blockade of overseas petroleum supplies appears in a report of Dr. Benjamin T. Brooks, consulting chemist and petroleum expert, to the American Chemical Society.

Statements that Germany lacks production facilities for the super gasolines, needed in swift pursuit and attack planes for greatest performance, have been common since the European war started. Dr. Brooks' analysis, one of the few yet published showing the other side of the picture, shows that:

1. Given adequate technical preparation, together with petroleum from Rumania and Russia, Germany should not be handicapped in quality or quantity of aviation fuels.

2. The catalytic process of making high-octane aviation fuels was discovered in Germany, and knowledge of the best methods can reasonably be assumed to be available there. No reliable information is available showing how far Germany has gone in this direction.

3. Germany apparently operates 20% of her air force with Diesel powered planes, thus conserving super gasolines for the fighters and fastest bombers.

4. Super fuels are not absolutely needed for long range bombing. Dr. Brooks recalls that Lindbergh flew the Atlantic 12 years ago with gasoline of only 69 octane rating. While merits of better gasoline are many, only the war itself will show whether 100 octane gasolines are as essential as many experts have indicated.

5. By water cooling many of its planes Germany is enabled to use benzene blends for fuel, as do many racing motor cars. This permits Germany to use some 4,500,000 barrels of benzene for aviation purposes.

6. By adapting injection fuel methods, discovered in Diesel engine development, many German planes can use a wider range of octane number fuels to much greater advantage.

Science News Letter, November 18, 1939

ORNITHOLOGY

First Thanksgiving Bird Saved from Fate of Dodo

PRE-THANKSGIVING note: There is a good chance that the genuine original Thanksgiving turkey will not join the dodo in ornithological extinction—the wild turkey, that is. The tame, domesticated, raised-for-the-market turkey is plentiful but the wild turkey, America's largest game bird, the symbol of Thanksgiving, has been in danger of vanishing. Once common over most of the U. S. east of the Rockies in wooded areas, wild turkeys whose ancestors fed the Pilgrims of New England have been rapidly disappearing. Reason: Woods converted to farmlands and overshooting. The U. S. Bureau of Biological Survey experts are making things easy and safe for them, cooperating with state game departments and sportsmen. Wild turkeys need large areas upon which to live. Some gobblers have been known to travel 15 miles from their roosts.

Science News Letter, November 18, 1939

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Economics

GOVERNMENT AND ECONOMIC LIFE, Development and Current Issues of American Public Policy, Vol. I—Leverett S. Lyon, Myron W. Watkins and Victor Abramson—*Brookings Inst.*, 519 p., $3. With the link between government and economic life in America becoming increasingly intimate, this book provides an interesting background to current problems. Here is traced the evolution of government's connection with business, implementation as well as control.

Science News Letter, November 18, 1939

Anthropology

RELIGION IN PRIMITIVE SOCIETY—Wilson D. Wallis—*Crofts*, 388 p., $5. A non-technical, though none the less comprehensive, survey of religious ideas and practices. Its points are emphasized by an inexhaustible store of illustrative incidents, from all ages and the world over.

Science News Letter, November 18, 1939

History

THE LIFE OF GREECE—Will Durant—*Simon and Schuster*, 755 p., $3.95. Another of Dr. Durant's large volumes, which provides something like a fireside educational course on a significant phase of the past. He traces with wealth of detail the rise, glory, and fall of the Greeks, closing with thoughts regarding elements of Greek civilization—good and bad—which are living on in the world today.

Science News Letter, November 18, 1939

Bacteriology

PATHOGENIC MICROORGANISMS (11th ed.)—William Hallock Park and Anna Wessels Williams—*Lea & Febiger*, 1056 p., $8. Revision of this classic text book for its eleventh edition was the last task of the distinguished senior author, a fact which for many readers will doubtless increase the desirability of owning the book.

Science News Letter, November 18, 1939

BOTANY

FLOWERING EARTH—Donald Culross Peattie—*Putnam*, 260 p., $2.50. See page 331.

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Geography

KANSAS, A Guide to the Sunflower State—Federal Writers' Project—*Viking*, 538 p., $2.50. What to see in "the exact center of the United States," and in a state that perhaps needs a guidebook more than a good many others, is discriminatingly pointed out in this handbook. What the people are like, their farming problems and their folklore are told by a well-informed guide; with the usual tour book data added.

Science News Letter, November 18, 1939

Archaeology

UNDER YOUR FEET, The Story of the American Mound Builders — Blanche Busey King—*Dodd, Mead*, 169 p., $2.50. A popular account of the Mound Building Indian culture, which flourished in the Mississippi Valley in pre-Columbian times.

Science News Letter, November 18, 1939

Exploration

FIVE MILES HIGH—Robert H. Bates, Richard L. Burdsall, William P. House, Charles S. Houston, Paul K. Petzoldt and Capt. Norman R. Streatfeild—*Dodd, Mead*, 381 p., $4. The highest climb yet made, except on Everest, is the American Karakoram Expedition's 26,000 feet reached in 1938 in ascending K2, which is the second highest of mountains. How the base of summit cone, 2,250 feet from the top, was reached by two hardy climbers is the engrossing climax of this well-planned book.

Science News Letter, November 18, 1939

Hobbies

LOW-COST CRAFTS FOR EVERYONE—H. Atwood Reynolds—*Greenberg*, 322 p., $2. Suggestions and directions for making such things as greetings, favors, toys, and useful gadgets out of such materials as shells, nuts, metal, oilcloth, gourds, and cones.

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Economics

FROM NAZI SOURCES: WHY HITLER CAN'T WIN—Fritz Sternberg—*Alliance Book Co.*, 208 p., $1.75. See page 328.

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Political Science—Geography

THE EARTH AND THE STATE, A Study of Political Geography—Derwent Whittlesey—*Holt*, 618 p., $3.75. See page 326.

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Medicine

THE HEALTH INSURANCE DOCTOR: His Rôle in Great Britain, Denmark and France—Barbara N. Armstrong—*Princeton Univ.* 264 p., $3. Both physicians and laymen concerned over the future of medical practice in the United States will do well to read this account of health insurance as it functions in three other democratic nations.

Science News Letter, November 18, 1939

Physics

RUTHERFORD—A. S. Eve—*Cambridge (Macmillan)*, 451 p., $5. Lord Rutherford of Nelson, Ernest Rutherford as he was born in New Zealand, Rutherford of Cavendish Laboratory, Cambridge, as he was known to his fellow scientists was a pioneer in modern experimental physics; pioneer atom splitter, the first of the true alchemists. This Life and Letters edited by a friend of long standing and formerly Macdonald professor of physics at McGill University, gives a vivid and intimate picture of the man and the rush of discovery that pivoted about him. Not in scientific reports are to be found essential side-lights on a great scientific career, but in anecdote and spontaneous letters Rutherford's years of discovery may be lived again.

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Economics

CONSUMER EXPENDITURES IN THE UNITED STATES; Estimates for 1935-36—National Resources Committee—*Govt. Print. Off.*, 195 p., 50c. See page 325.

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Mathematics

DESCRIPTIVE GEOMETRY—A. V. Millar and K. G. Shiels—*Heath*, 192 p., $2.25. A University of Wisconsin text for use by engineers. It includes the intricate art of representing objects of three dimensions on a plane surface. In various editions the book has been in use for the last 25 years.

Science News Letter, November 18, 1939

Archaeology—Chemistry

THE COMPOSITION OF ANCIENT GREEK BRONZE COINS—Earle Radcliffe Caley—*American Philosophical Soc.*, 203 p., 4 pl., $2.50. Both archaeologists and students of coins will find this chemical investigation by Prof. Caley of considerable interest. His analyses reveal significant facts about coinage history as well as Greek economics, show why methods of cleaning coins vary in success, and provide chemical evidence for solution of numismatic problems.

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Natural History

SOUTHERN NATURE STORIES, Book Two—W. B. Baker, Lucien Harris, Jr., and Wallace Rogers—*Turner E. Smith*, 239 p., 88c. Stories of the plant and animal life of the piney woods, swamps, hammocks, for children in the schools of the South.

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